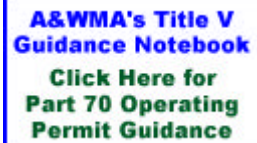


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**"Inside-Out" Well Simultaneously Samples Groundwater and Soil Vapor at Waste Disposal Sites**

An "inside-out" combination well to trace aquifer-threatening contaminants beneath waste disposal sites developed by researchers at the U.S. Department of Energy's Idaho National Engineering and Environmental Laboratory (INEEL) simultaneously performs gas sampling and groundwater sampling in the same bore hole, a process that until now required complex well-within-a-well solutions.

The technology is being used to monitor volatile organic compounds (VOCs) at INEEL, Sandia National Laboratory, Los Alamos National Laboratory, NASA White Sands, and Tucson Airport.

"Conventional designs for combination groundwater and gas sampling wells placed the gas sampling tubing inside the well casing and sampling ports penetrated the casing at various depths," said Joel M. Hubbell, an advisory scientist with the Applied Geosciences Unit at INEEL. "But this physically interfered with the placement of groundwater pumps and samplers lowered within the well and usually required an inner casing." By turning the well inside out—attaching the gas sampling tubing and ports on the exterior of the casing—Hubbell claims to have eliminated costly problems and streamlined implementation.

With the inside-out well, groundwater and soil gas sampling activities do not interfere with each other, so the well can be used simultaneously for monitoring and remediation, allowing direct comparison of data.

"The combination well significantly lowers overall costs compared to installing separate bore holes for groundwater sampling and vapor sampling," said Hubbell. Design feasibility was proven at INEEL's Radioactive Waste Management Complex, a low-level radioactive and hazardous waste storage facility that overlies the Snake River Plain aquifer. Seven wells were constructed to depths

of 178 meters with three to nine gas ports per well to track chlorinated solvent vapors.

Sandia National Laboratory is using the INEEL technology in six 140–486 feet deep vapor extraction wells at a two-acre chemical waste landfill. "To reduce monitoring system installation costs, each of the new vapor extraction wells was constructed with three to five subsurface soil gas monitoring ports," said Lee Brouillard, senior hydrogeologist with Duke Engineering & Services in Albuquerque, NM, which installed the system. "Compared to an alternate system requiring six separate bore holes for soil gas monitoring, the combination wells saved about \$60,000."

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### **Atlanta-Based Joint Venture to Assist South Africans with Waste Management Study**

Integrated Wastetechnologies International, LLC, will conduct an integrated waste management feasibility study for South Africa to determine the economic viability of constructing an integrated waste processing facility there. The study could lead to a \$75–\$100 million contract to build the first in a series of waste processing plants near Johannesburg.

Integrated Wastetechnologies is a joint venture of Municipal Waste Management and Hollis & Company. The team expects to accomplish the following objectives in performing the South African feasibility study:

- Evaluate materials in the waste stream that can be reprocessed for market.
- Identify and appraise the market value for manufacturing-ready raw materials and consumer finished goods developed by the facility.
- Locate potential sites for the waste processing facility.
- Provide preliminary design plans.
- Identify downstream businesses for an Integrated Wastetechnology Park.

According to John Hayes, president of Municipal Waste Management, the study team also will evaluate the South African collection system and recommend changes that will improve work efficiency with the integrated approach.

Finally, the joint venture will assist South Africa in developing educational programs on proper waste handling techniques and recommend steps to effectively manage waste generated in the